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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,438	02/13/2004	Colin McCullough	56873US002	8765

32692 7590 05/16/2006

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EXAMINER
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SAVAGE, JASON L

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 05/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/779,438

Applicant(s)

MCCULLOUGH ET AL.

Examiner

Jason L. Savage

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-47 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>20060130, 20060207, 20060411</u> | 6) <input type="checkbox"/> Other: _____  |

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough et al. (US 6,344,270) in view of Hannen (US 6,047,586).

McCullough teaches a composite wire or cable that includes fiber reinforced metal matrix composites comprising a core containing at least one tow comprising a plurality of substantially continuous, longitudinally positioned reinforcing fibers of ceramic or carbon which is encapsulated within a metal matrix (col. 3, ln. 31-45). McCullough further teaches that the wire or cable may have a metal covering the metal matrix composite core (col. 9, ln. 21-65 and figures 4-5). However, McCullough does not exemplify an embodiment wherein the metal matrix composite core comprises a metal cladding.

Hannen teaches that a composite wire or cable that includes fibers 2 disposed in a metal matrix 1 (col. 47, ln. 3-19). Hannen further teaches that a ductile outer cladding 4 may be provided on the composite wire to provide beneficial properties such as enhanced corrosion resistance or to act as an insulation layer (col. 4, ln. 10-19).

It would have been obvious to one of ordinary skill in the art to have modified the composite wire or cable of McCullough by following the teaching of Hannen of cladding

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the wire with a ductile layer to enhance the properties of the wire such as by providing increased corrosion resistance with a reasonable expectation of success.

McCullough also teaches that the wire or cable has a roundness value of at least 0.95, a roundness uniformity value of not greater than 1.5%, and a diameter uniformity value of not greater than 0.5% over a length of at least 100 meters (col. 1, ln. 57 – col. 2, ln. 6). McCullough further exemplifies embodiments wherein the roundness uniformity value is as low 0.94% and the diameter uniformity value of 0.21% (Table 1, runs 12 and 6 respectively).

Although the prior art does not exemplify embodiments having the claimed properties, it teaches that the claimed properties as being maximum or minimum values with no upper or lower limit boundaries being specified. As such, it would have been obvious to one of ordinary skill in the art to have formed the metal-clad metal matrix composite wire having a roundness uniformity value lower than the 1.5% and a diameter uniformity value lower than the 0.5% including having values within the ranges claimed by Applicant. Furthermore, McCullough exemplifies embodiments having values that are so close that prima facie one skilled in the art would have expected them to have the same properties, *Titanium Metals Corporation of America V. Banner*, 227 USPQ 773.

Regarding claim 25, McCullough teaches what is set forth above but does not exemplify an embodiment wherein the roundness value is at least 0.98. However, as was set forth above, since McCullough only teaches the minimum value for the

roundness value of being at least 0.95, higher values including that claimed by Applicant would have been obvious.

Regarding claims 2 and 26, McCullough teaches embodiments comprising multiple tows (Figure 4). Furthermore, McCullough teaches the composite wire or cable typically contains a plurality of tows (col. 1, ln. 40-48).

Regarding claims 3-4 and 27-28, since McCullough teaches the same wire structure as that claimed by Applicant including having a metal cladding covering, the wire of McCullough would be just as plastically deformable and just as effective to dampen recoil effects to prevent secondary fractures and the as the wire claimed by Applicant.

Regarding claims 5 and 29, the clad wire of McCullough would exhibit a larger strain to failure as compared to the strain to failure exhibited by an unclad wire.

Regarding claims 6-8 and 30-31, McCullough teaches the matrix material may be aluminum, zinc, tin and alloys thereof and further teaches that the matrix material is preferably aluminum having a purity of greater than 99.95% by weight (col. 6, ln. 1-16).

Regarding claims 9-13 and 32-36, McCullough is silent to the material used to form the metal cladding. However, it would have been within the purview of one of ordinary skill in the art to have recognized what materials could suitably be used to clad the wire. Given the teaching that the matrix material is preferably pure aluminum, it would have been obvious to have used high purity aluminum as the metal cladding as well with a reasonable expectation of success. A cladding of aluminum would meet the claim limitations of having a melting point less than 700 C.

Regarding claims 14 and 37, McCullough is silent to the cladding thickness. However it would have been within the purview of one of ordinary skill in the art at the time of the invention to have determined the thickness of the cladding layer that would be necessary in order to maintain the wires in the core in a stranded configuration (col. 9, ln. 32-38). Absent a teaching of the criticality or showing of unexpected results due to the claimed thickness, it would not provide a patentable distinction over the prior art.

Regarding claims 15 and 38, McCullough teaches that at least 85% of the wires in the tow are continuous (col. 3, ln. 31-44).

Regarding claims 16 and 39, McCullough teaches the core comprise between 30 to about 70 volume % of fibers and preferably between 40 to 60 volume % of fibers (col. 5, ln. 45-53).

Regarding claims 17-19 and 40-42, McCullough teaches the fibers are ceramic oxide fibers such as polycrystalline alpha alumina based fibers wherein the fibers comprise at least 99 percent by weight of alumina (col. 4, ln. 17-31).

Regarding claims 20-24 and 43-47, McCullough teaches a plurality of the metal clad composite wires may be helically stranded to form a permanently set cable and that the cable may also include core and shell structure comprising a shell of secondary aluminum wires (col. 8, ln. 52-68).

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-47 have been considered but are moot in view of the new ground(s) of rejection.

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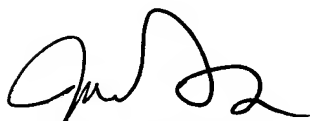
Applicant argues that McCullough does not teach the structure of a wire or cable as claimed having a metal cladding (emphasis added) covering the metal matrix composite core. While McCullough does teach a tape overwrap **83** and conductor layers **93A** and **93B** (see Figures 4 and 5), it does not explicitly recite the use of a metal cladding on the composite core structure. However, as was set forth in the rejection above, Hannen teaches that the use of a metal cladding on a composite core structure comprising fibers in a metal matrix is known for providing the formed wire with enhanced properties. As such, it would have been obvious to one of ordinary skill in the art to have modified the composite wire or cable of McCullough by following the teaching of Hannen of cladding the wire with a ductile layer to enhance the properties of the wire such as by providing increased corrosion resistance with a reasonable expectation of success.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jason Savage

5-11-06



JENNIFER C. MCNEIL  
SUPERVISORY PATENT EXAMINER

5/16/06